

## NEW BEDFORD HARBOR SMS MODELING

### 1. GENERAL

The New Bedford Harbor Superfund Site extends from the northern reaches of the Acushnet River Estuary south through the commercial port of New Bedford Harbor and adjacent areas of Buzzards Bay. The sediments in the harbor are contaminated with high concentrations of many pollutants, notably PCBs and heavy metals from the industrial and urban development surrounding the harbor. The site has been divided into three areas based on geographical features and levels of contamination – the upper, lower, and outer harbors. The upper harbor extends from slightly north of the Wood Street Bridge to the Coggeshall Street Bridge. The lower harbor extends from the Coggeshall Street Bridge to the hurricane barrier. The outer harbor is the area between the hurricane barrier and a line drawn from Rock Point southwesterly to Negro Ledge and then southwesterly to Mishaum Point (see figure 1).

The cleanup plan for the upper and lower harbor areas involves the removal of approximately 450,000 cy of contaminated sediment, containment of the sediments in four shoreline confined disposal facilities (CDFs), treatment of water decanted from the sediments and capping of the CDF's. The approximate location of the CDF's is shown in figure 2.

Hydrodynamic modeling was performed for the New Bedford Superfund Site to determine impacts of the confined disposal facilities on water circulation patterns and flood levels.

### 2. HYDRODYNAMIC MODELING

a. General. The U.S. Army Corps of Engineers Waterways Experiment Station (WES) developed a two-dimensional numerical hydrodynamic and transport model for New Bedford Harbor during the Engineering Feasibility Study (EFS). New England District re-activated the model on a PC computer under the Surface Water Modeling System (SMS), and used it to evaluate various engineering plans and their impact on water levels, circulation patterns, and resulting currents within the harbor.

b. Surface Water Modeling System (SMS). SMS was developed by Brigham Young University in cooperation with WES and the U.S. Federal Highway Administration. SMS is a pre- and post-processor for two dimensional finite element and finite difference models. Interfaces have been designed to be used in conjunction with either the TABS-MD suite of programs maintained by WES, or the FESWMS package commissioned by FHWA. The TABS programs calculate water surface elevations and flow velocities which can be read into SMS to generate plots and dynamic animation sequences. The RMA2 interface (part of the TABS package) was used for this analysis.

c. Confined Disposal Facilities Evaluated. The existing marsh mesh (figures ? and ?) was modified to include the four proposed confined disposal facilities. Final designs on the CDF's were not available, information on size was obtained from Foster Wheeler Design Analysis Reports and workplans. CDF-A was estimated to begin approximately 1630 feet from the upper boundary of the model and is 1680 feet in land-side length and 760 feet in water-side length. The maximum width was estimated to be 380 feet. CDF-B has water-side and land-side lengths of approximately 1630 and 2065 feet, respectively. The maximum width was estimated to be 325 feet. CDF-C begins approximately 260 feet upstream of the Coggehall Street Bridge and has a length of approximately 1100 feet. The maximum width was estimated as 250 feet. CDF-D is approximately 1425 feet long and 640 feet wide. The location and sizes of the CDF's, as they were put into the model, are shown on figure ?.